VCH-003 Synchronization Supply Unit – Vremya-ch

vremya-ch.com/index.php/en/products-en/telecommunic-en/vch-003-en/index.html

The VCH-003 Synchronization Supply Unit (SSU) is designed for use in Telecommunications Networks. Depending on its configuration, the VCH-003 SSU can be used to generate and distribute 2048 kHz and 2048 kbit/s synchronization signals as part of a Primary Reference Clock (PRC) system; to operate as a Transit Node Clock (TNC) or Local Node Clock (LNC), recovering synchronization signals derived from transmission lines at network nodes; or to generate synchronization signals using GLONASS/GPS GNSS references.

Primary Application synchronization of digital telecommunications networks, SDH.

Key Features

– when used as part of an enhanced Primary Reference Clock (ePRC), the output synchronization signals comply with **ITU-T Recommendation G.811.1** .
– When operated as a Transit Node Clock (TNC) or Local Node Clock (LNC), the SSU complies with ITU-T Recommendation G.812.
– Reference frequency and UTC time combiner (ITU T G.811.1/G.8272.1).
– Up to 8 synchronization inputs: **2048 kHz, 2048 kbit/s (E1), 1 MHz, 5 MHz, and 10 MHz** .
– **1 PPS** synchronization input.
– Synchronization inputs from a **PTP Grandmaster (PTP GM)** .
– Multi-band GNSS GLONASS, GPS, BeiDou, GALILEO (L1/L2,E1/E5, B1/B2).
– Spoofing detection.
– Synchronization from **GNSS** signals; in this mode, the output synchronization signal characteristics comply with **ITU-T Recommendation G.811** .

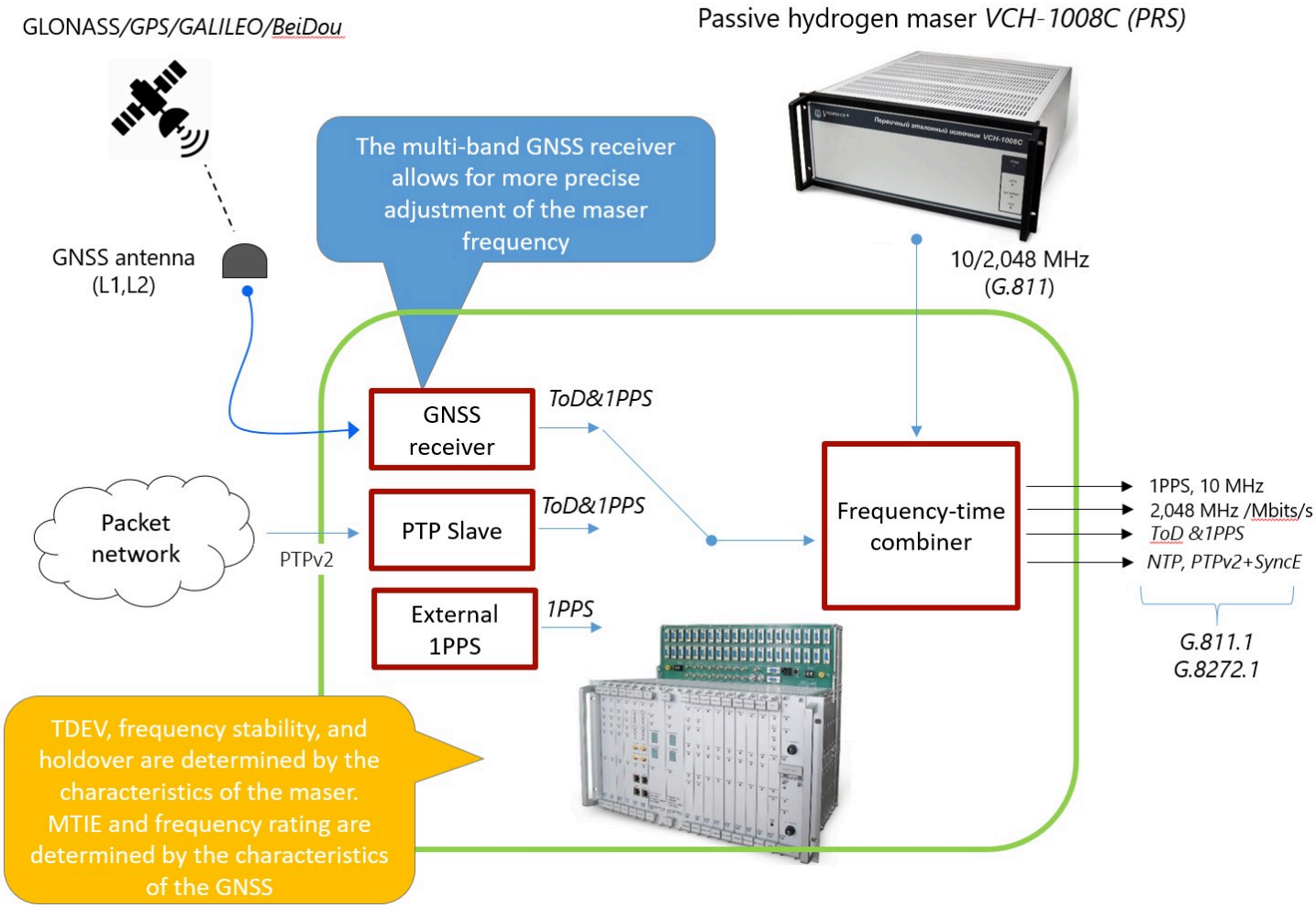
– Automatic validation of input synchronization signals.
– Monitoring of input signal parameters **MTIE, TDEV, dF/F** .
– Time synchronization via **NTP** and **PTP** protocols in Master/Slave modes, with **SyncE** support.
– high-stability internal **quartz crystal (DOCXO) or rubidium oscillator** .
– Internal DOCXO aging (frequency drift) compensation in Holdover mode (DOCXO+ option).
– Advanced **Direct Digital Synthesis (DDS)** technology.
– Up to **80 outputs with 1:1 redundancy** , compliant with **ITU-T G.703** (balanced interface, 120 Ω load).
– 20 user-configurable outputs per output signal generation module and per output signal distribution module.
– Independent configuration of each output: **2048 kHz / E1 / Off** .
– hot-swappable modules.
– Input signals are connected via universal **BNC connectors** , while output signals are available through widely used **DB9 connectors** .
– Fully redundant architecture with **1:1 protection** .
– **Bypass mode** , allowing the VCH-003 to continue operating and provide uninterrupted synchronization signal output even when the oscillator modules are not installed or available.
– Advanced signal processing and distribution.
– Continuous measurement and quality monitoring of input synchronization signals.
– Analysis of **Synchronization Status Messages (SSM)** on input synchronization signals and generation of SSM information in the output E1 stream.
– Graphical management software.
– Remote software updates.
– **9U ETSI / 19-inch chassis.** – SSUManager local control/monitoring software. – Global multi-user NMS (Linux, PostgreSQL).

Oscillator Options
the customer can select the most suitable oscillator type: – **rubidium oscillator — ITU-T G.812 Type II** ;
– **double-oven quartz crystal oscillator — ITU-T G.812 Type I** .

NTP Functions
– synchronization of the local time scale to **UTC** using a GNSS reference.
– **NTP v3 and NTP v4** Network Time Protocol support in accordance with **IETF RFC 1305** and **RFC 5905** .
– **Stratum 1 NTP server** .
– Support for up to **50,000 NTP clients** .
– Up to **16 IPv4 addresses per Ethernet port** , with VLAN support.

PTP Functions
– **Precision Time Protocol PTPv2 (IEEE 1588v2)** .
– Inputs: antenna GNSS, external 1PPS, PTPv2 slave.
– PTP operation in **Master and Slave modes** .

– **Synchronous Ethernet (SyncE)** support in accordance with **ITU-T G.8261** , as well as ESMC message transmission.
– One RJ-45 and one isolated SFP ports (1000BASE-X) on each GNSS card.
– Configuration of up to **16 IPv4 addresses per Ethernet port** , VLAN support, and simultaneous operation of multiple PTP profiles.
– In Master mode, synchronization of the local time scale to **UTC** using a GNSS reference.
– Internal time-scale resolution: **5 ns** .
– Up to **1,024 PTP clients** at a synchronization message rate of **128 packets per second** .
– PTP message addressing modes: **multicast, unicast, or mixed** .
– PTP message transmission: Ethernet (L2), UDP(L3, IPv4).
– Timestamping modes: **one-step or two-step** .
– Delay measurement mechanisms: **end-to-end (E2E)** or **peer-to-peer (P2P)** .
– Supported profiles:
• Frequency synchronization — **ITU-T G.8265.1 (unicast, L3)** ;
• Phase/time synchronization — **ITU-T G.8275.1 (multicast, L2, syncE)** ;
• Phase/time synchronization — **ITU-T G.8275.2 (unicast, L3, syncE)** ; • User-defined profiles.

Technical Specifications
Interfaces : RS-232C, USB, LAN.
Power supply : 36–72 V DC, dual power inputs.
Power consumption : max. 76 W; 130 W during warm-up.
Dimensions (W × H × D) : 483 × 399 × 302 mm.
Mounting : 19-inch rack.
Weight : 5 kg.

Frequency-Time combiner mode